



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

ON THE LARVÆ OF CERTAIN NEMATINÆ AND BLENNOCAMPINÆ, WITH DESCRIPTION OF NEW SPECIES.

BY HARRISON G. DYAR, PH.D.

Pontania borealis Marlatt.

Galls on *Salix sericea* at Plattsburg, N. Y.; solitary, smooth, exceeding the edge of the leaf, reaching from the midrib to beyond the margin and at varying distance from the base; not evenly divided by the leaf about one-third above, two-thirds below; shape pyriform or rounded; a few corky dots; color greenish, strongly red shaded, especially above; length, 8-9 mm., width about 6 mm., height, 5 mm. The substance is thick, fleshy, white with pink lines.

Larva.—Head .6 mm.; all white, eye and mouth black.

Last Stage.—Head whitish, a dusky shade above the clypeus, eye black mouth, brown; width 1.0 mm. Body all white, waxy, not shining, segments obscurely 3-annulate, a little shaded with blackish in the folds. Thoracic feet rather large, colorless; abdominal ones on joints 6 to 11, distinct, slender. Body uniform, subventral folds somewhat prominent, joint 13 tapering. Length, 6.5 mm. Single brooded; cocoons in decayed wood.

Pontania consors Marlatt.

Galls found with the preceding on *S. sericea*, but gregarious, hairy and spherical. Near the base of the leaf, three or two together, rarely but one, exceeding the margin often by half the diameter of the gall; not evenly divided by the leaf, about one-third or a little more above, two-thirds below; pale greenish, often heavily marked and mottled with red above, paler below, rarely uniformly pale. Strongly silky hairy like the leaves below, less hairy or even smooth above; size $8.5 \times 8.5 \times 7$ mm. or as small as 5 mm. in diameter. The substance is fleshy, strongly streaked with pink.

Larva.—Head .9 mm.; all white, eye and mouth black, segments annulate, with large obscure concolorous tubercles; joint 13 tapering.

Single brooded; cocoon in decayed wood.

Pteronus carpini Marlatt.

Gregarious on the iron wood,* Fort Lee, N. J., in September. Head shining black, 1.8 mm. wide, under the lens black dotted on a

* I am not certain now whether this tree was the *Ostrya virginica* or *Carpinus caroliniana*.

sordid ground, mouth brownish. Feet on joints 6-11; no glands everted. Segments coarsely 4-annulate with small dark setæ. Color dull green, the spiracles with faintly discolored yellow blotches; dorsal region shaded with black, the color streaked on the annulets, not forming a distinct regular edge and not complete, tending to be broken into dorsal and subdorsal bands. Subventral folds double. A spot below the spiracle and one above the base of the leg, black. Thoracic feet and venter pale. Imago in May. The species is probably double brooded. The larva looks like that of *Pteronus corylus*.

Pteronus integer Say.

Dr. Packard describes a larva on spruce (5th Rept. U. S. Ent. Comm., p. 838) as of this species. It is green with a dusky supra-ocular shade, the dorsal vessel edged with light green and a white lateral stripe. The number of feet is not given.

I think there is some error here and that this larva is not that of *integer*. The true larva is described herewith.

Stage V.—Head sordid greenish with a heavy brown-black shade reaching up each side behind the eye, a dotted shade on vertex, the sutures pale; width 1.6 mm. (♀). Body green like *Nematus chloreus* not very sordid nor very transparent; black marks at the base of the thoracic feet. Segments irregularly 6-annulate in this large larva, bringing the spiracle on third annulet, 5-annulate in another with spiracle placed normally. No other marks. Anal plate concave-truncate as in *N. chloreus*. The larva is throughout closely allied to *chloreus* and differs only in having the head marked with dark shades in the last stage. Tracheal line visible.

Single brooded, no ultimate stage; cocoon as usual in the earth.

Found on *Quercus tinctoria* at Brookhaven, Long Island; not common, the rarest of the oak feeding Nematids.

Pteronus quercus Marlatt.

Solitary on white oak (*Q. alba*) resting on the edge of the leaf.

Stage IV.—Head round, eye black, a very faint posterior dark shade; width .9 mm.; whitish, sordid with scarcely any ochreous tint. Body colorless, translucent, appearing sordid from the food by transparency, the incisures folded; segments obscurely 4-annulate, smooth; anal plate concave-truncate, no prongs. A large black spot at the base of the colorless thoracic feet; abdominal ones on joints 6-11. Tracheæ white.

Stage V.—Head 1.3-1.5 mm. (♂ ♀) colorless, faintly yellowish,

eye black; a distinct shaded black line posteriorly from behind the ocellus to vertex. Body sordid greenish, annulets dull, incisures folded. Anal plate and marks at base of thoracic feet as before. Tracheæ and folds of incisures white.

Single brooded; cocoon in the ground.

This larva closely resembles *Nematus chloreus* but is not so green and has a black shade on the head in the last stage. Brookhaven, Long Island, in June.

***Nematus chloreus* Norton.**

On the black oak (*Q. coccinea*) at Bellport, Long Island, in June, a solitary edge-eating Nematid.

Egg slits in the edge of the leaf just before the point of the apex, 1 mm. long, .5 mm. deep, semi-circular, swollen, yellowish.

Stage I.—Head sordid whitish, eye black, a dusky shade behind and over clypeus; width .4 mm. Body whitish translucent, green from the food, smooth, slender, curved, annulate; feet on joints 6–11; a ventral elevation on joint 5; no setæ. Black marks at the base of thoracic feet.

Stage II.—Head whitish, dull, eye black, the vertical shade behind it reaching nearly to apex; width .6 mm. Body rather finely annulate, whitish, green only from the food, bases of thoracic feet marked with black. Anal plate truncate, concave, the posterior rim dusky bordered.

Stage III.—Head rounded, whitish, eye black, a dark shade behind; width .8 mm. Body translucent sordid greenish, no marks except at bases of thoracic feet; spiracles blackish.

Stage IV.—As before, the dusky shade behind the eye has become small; width 1.15 mm. Anal plate projecting, truncate-concave; no prongs. Translucent whitish green with black marks at base of thoracic feet.

Stage V.—Head green, eye black, mouth brown, no marks; width 1.4–1.6 mm. (♂ ♀) clearer green than before, incisures folded; black marks at bases of thoracic feet clouded, small. Anal plate truncate, slightly cordately notched, no prongs. A little green fat in joint 13, the frass not contrasted; dorsal vessel obscure. Head shagreened, dull; body also dull. Thoracic feet colorless, abdominal ones small, slender on joints 6–11 and 13, functional. Segments irregularly wrinkly 6-annulate, last annulet very narrow, the others subequal; no setæ even under a $\frac{1}{2}$ -inch objective. Sometimes the body is faintly yellowish subdorsally from the obscure fat granules; spiracles dusky.

Cocoon elliptical dark brown, single, formed at the surface of the ground. Single brooded. This is the commonest of the oak feeding nematids on Long Island, N. Y.

***Hemichroa fraternalis* Norton.**

♂ described by Norton (Trans. Am. Ent. Soc., IV, 81).

♀ black and rufous. Head black; prothorax pale, whitish, interior lobe of mesothorax and upper half of pleura shaded with brown; abdomen largely pale brown. All the segments above broadly banded with black and narrowly so below. Legs luteous, femora and tibia lined with black. Wings hyaline, nervures black, costa and stigma luteous. Length, 9 mm. Texas, New York, Massachusetts. A perfectly distinct species, not nearly allied to *H. albidovariata*. The larva lives on the young leaves of the white oak in May and early June, solitary. Each larva eats away the leaf from the midrib or a large vein and uses the vein as a perch somewhat in the manner of the young *Liminitis*. They hold on by the thoracic feet and thresh the body around violently when disturbed. There are probably five larval stages.

Stage I.—Head rounded, dull, dusky, eye black; width .4 mm. Body annulate, sordid grayish green, uniform with short black points. A dark line at base of thoracic feet.

Stage II.—Head .6 mm., sordid whitish, gray posteriorly, eye black; body slate gray, whitish below the spiracles.

Stage III.—Head small, leaden black, width .9 mm. Segments 6-annulate, with black points on the second and fourth. Body slate gray, more or less whitish subventrally below the spiracles, a dusky shade along subventral folds. Thoracic feet largely black, abdominal ones small, on joints 6-12, 13. Venter waxy grayish white.

Stage IV.—Head sordid leaden, clypeus and back of head nearly black; antennæ and eye black; width 1.3 mm. Dorsum leaden black, somewhat broadly greenish centrally except in the incisures, below the spiracles nearly white, the subventral folds marked in blackish, forming a double row of dashes. Thoracic feet largely black, abdominal ones pale. Black points on second and fourth annulets small. Later the larva becomes more greenish with growth.

Stage V.—Head black, the face pale and vertex gray; or a light fleshy brown; width 1.6-1.8 mm. (♂ ♀). Body sordid greenish gray, white subventrally, a lateral leaden gray shade band touching the stigmal line; dusky marks on the subventral folds; points small, black. Thoracic feet pale, black at base; a trace of white bloom on head. In some the subventral region is scarcely contrasted and the larva appears

more uniformly gray. The black points vary in distinctness, sometimes obsolete. Occasionally the larva is very pale, an albino, with dull red head and sordid white body marked with an olivaceous blackish lateral band.

No ultimate stage; cocoon dark brown, formed in the earth. Single brooded.

Larva referred to as "F" Can. Ent. XXVII, 339.

Hemichroa albidovariata Norton.

♀ described by Norton (Trans. Am. Ent. Soc. IV, 81).

♂ closely similar to ♀ with the three basal segments of abdomen above yellowish white, the basal plates black. Two ♀♀, one ♂ from Texas (Belfrage), coll. U. S. Nat. Mus., one ♀ from larva at Bellport, Long Island, N. Y. The larvæ live on the black oak (*Q. coccinea*) in May, eating the young leaves, resting on the edge, the abdomen slightly curled.

Stage V.—Head pale red-brown, eye narrowly black, mouth dark brown; width 1.8 mm. (♀). Feet on joints 6–12, 13, moderate; segments regularly and distinctly 6-annulate, spiracle on second annulet. Color translucent fleshy brown, a lateral row of irregular black spots on annulets 1 (small), 2–3 (large), 4–5 (rather small), the large one broken on some segments; all absent on joint 13; anal plate immaculate. Some small black marks around spiracle; a distinct black patch on the anterior subventral fold and a smaller patch on the posterior one. Feet and venter unspotted, but a black mark at the base of thoracic feet. Dorsal vessel and paired dots on annulet 1 dusky translucent.

No ultimate stage; cocoon in the ground; single brooded.

Hemichroa phytophagica, sp. nov.

♀ extremely similar to *H. albidovariata* but the pale lines on anterior lobe of thorax are short and obscure and the basal plates of abdomen are black.

One ♀ bred from larva from Bronx Park, New York, and two ♀♀ in coll. U. S. Nat. Mus. marked "saw fly on white oak" from Miss Murtfeldt, No. 241 M., Dept. Agriculture, No. 3168.

Found on the young leaves of the white oak in May.

In Bronx Park these larvæ were mixed with those of *H. fraternalis*, and showed somewhat the same habits by eating away the leaf from the midrib; but they do not use this as a perch and are true edge eaters.

Stage I.—Head rounded shining black-brown; width .4 mm.

Body lustreless blackish, segments 6-annulate with rows of short, blunt, pale points on second and fourth annulets, about six on each side.

Tracheal line pale; feet on joints 6-12, 13. Eats the whole leaf on the edge.

Stage II.—Head pale, faintly brownish, eye black with a very faint dark shade reaching upward. Body whitish translucent, colored by the food, the points blunt, fleshy, dark at tip.

Stage III.—Head very pale brownish, eye narrowly black. Body translucent waxy whitish, segments 6-annulate, the points whitish; no marks. Incisures folded, tracheal line white.

Stage IV.—Head pale brown, eye black. Body moderately translucent, dull whitish with a tinge of yellowish and green, the folds of skin whiter. Points obsolete; no marks or, in some, a small black patch laterally on third annulet and another on anterior subventral fold, more or less distinct. In some the points are still visible, pale, rarely distinctly defined by dusky dots. Spiracle on the second annulet.

Stage V.—Head pale, finely brown dotted, eye black. Segments 6-annulate, smooth, no points seen. Skin thin, the body uniformly green from the blood, dorsal vessel dark, outlined by a little green fat, not contrasting strongly. A black patch on the anterior subventral fold and sometimes another laterally. Tracheæ evident, their ramifications visible nearly up to the dorsal vessel. Thoracic feet pale; anal flap smooth. Abdominal feet on joints 6-12, 13. The larva is now very green, differing markedly from the preceding stages. A single example from Bellport, Long Island, had a black dot on the thorax, subdorsally on the second annulet of joints 2 and 3, one on the anterior subventral fold of joint 3 and one at base of each thoracic foot. The paired dusky translucent patches in annulet 1 were also noted. No ultimate stage; cocoon in the ground; single brooded. This larva is possibly a dimorphic form of *H. albido variata*, but the food plants differ and the slight imaginal characters seem correlated.

GENERIC SYNOPSIS OF THE BLENNOCAMPINÆ.

The following tables have been prepared by Mr. Ashmead for his forthcoming revision of the genera of saw flies and he has kindly given me a copy of them for use here.

Family SELANDRIIDÆ.

TABLE OF SUBFAMILIES.

Lanceolate cell petiolate; (in only a single genus, *Kaliosysphinga*, does it appear contracted, but the anal vein is faint or subobsolete before uniting with the submedian vein, while the anal cell in hind wings is wanting).

Subfamily I. *Blennocampinae*

Lanceolate cell contracted before the middle but still open.

Antennæ 4-jointed, the third joint very long, the fourth very minute.

Subfamily II. *Blasticotominæ*

Antennæ 7 to 15-jointed, the third joint not unusually long, often shorter or not longer than the fourth.....Subfamily III. *Selandriinæ*

Lanceolate cell contracted at or at little before the middle and completely closed.

Subfamily IV. *Hoplocampinae*

Subfamily I. BLENNOCAMPINÆ.

TABLE OF GENERA.

1. Front wings with four submarginal cells.....2
Front wings with three submarginal cells, the first transverse cubitus wanting, very rarely with the second transverse cubitus wanting.
Hind wings with two discal cells.....2
Hind wings without discal cells.
Antennæ 11-14 jointed.....*Fênella Westw.*
Antennæ 9-jointed.
Hind wings with a distinct anal cell.....*Fenusia Leach.*
Hind wings without an anal cell.....*Kallosysphinga Tschb.*
2. Head transverse; clypeus anteriorly truncate; front wing with the second transverse cubitus wanting.....*Palmatopus Hartig.*
Head large, quadrate, the temples broad; clypeus anteriorly deeply emarginate; antennæ densely hairy, the third joint nearly as long as joints 4-5 united.
Xenopates Cameron.
3. Eyes extending to base of mandibles or at most with only a linear space between. 7
Eyes more or less distant from base of mandibles, with a distinct space between.
Hind wings not surrounded by a bordering nervure at apex.....4
Hind wings surrounded by a bordering nervure at apex, and without a discal cell; claws bifid or with a tooth within.
Anal cell in hind wings shorter than the submedian, petiolate or subpetiolate at apex. ♂.....* *Periclista Knowl.*
(= *Mogerus* Mac G.)
Anal cell in hind wings fully as long as the submedian. ♂
Isodyctium Ashm. g. n.
(Type *caryiculum* Dyar.)

* Mr. MacGillivray was not justified in changing the name of this genus, since the cynipid genus is *Periclistus*, not *Periclista*.

Claws simple; anal vein in front wings curving upwards at tip; transverse cubitus in hind wings very short, the anal cell longly petiolated. ♀ ♂.

Blennocampa Hartig.

11. Third transverse cubitus curved inwardly, not extending in the same direction with the transverse radius, strongly divergent; third submarginal cell larger than the first and second united; pedicel as long as the scape, about thrice as thick. ♂ **Calozarca Ashm. g. n.**

(Type *fascipennis* Nort.)

Third transverse cubitus straight or nearly so, and running in the same direction with the transverse radius; third submarginal cell hardly longer than the second, much smaller than the first and second united; pedicel shorter than the scape. ♂ **Erythraspides Ashm.**

12. Third transverse cubitus in front wings not running in the same direction with the transverse radius; marginal cell in hind wings *with* an appendage; third joint of antennæ much shorter than joints 4-5 united; claws with a small tooth within **Scolioneura Konow.**

Third transverse cubitus in front wings almost interstitial with the transverse radius, and running in the same direction; marginal cell in hind wings without an appendage, sometimes open at apex; claws with a strong triangular tooth at base **Entodecta Konow.**

13. Hind tarsi usually longer than their tibiæ; clypeus very small, transverse-linear. antennæ densely pilose, the third joint longer than the fourth. ♀ ♂.

Zarca Cameron.

Hind tarsi not longer than their tibiæ; clypeus not small, anteriorly subemarginate or truncate.

Antennæ pubescent, the third joint distinctly longer than either the fourth or the fifth.

Third submarginal cell longer than the first and second united; antennæ long, tapering toward tips, the third joint about as long as joints 6-9 united ♀ **Calozarca Ashm.**

Third submarginal cell not longer than the first and second united; antennæ with the third joint usually not longer than joints 9-10 united **Monophadnus Hartig.**

Antennæ clothed with long appressed hairs, the third and fourth joints equal, the fifth longer, all somewhat thickened toward tips. . **Senoclia Cameron.**

Periclista diluta Cresson.

These larvæ are briefly described from Riley's notes in Packard's Forest Insects (5th Rept. U. S. Ent. Comm., p. 206), but without giving the most essential characters. The bred flies in collection U. S. Nat. Mus., have the lanceolate cell of hind wings unusually long, though still shortly petiolate at tip.

Periclista purpuridorsum, sp. nov.

♂. Black, segments 2 to 4 of tergum dull luteous; angles of prothorax (except a black dot) and tegulæ white; tip of clypeus and labrum pale. Legs black at base, ends of femora and tibiæ whitish and brown, tarsi dusky, nervures brown black; second recurrent received at base of third submarginal cell, almost interstitial.

♀. Reddish brown and black. Head black, tip of clypeus and labrum pale brown. Thorax brown, a black spot on each lobe, lower half of pleura and pectus black; prothorax and tegulae whitish. Abdomen brown, shaded with black on each segment, the basal four segments solidly black; ovipositor sheath black; all the segments above and below narrowly lined with whitish posteriorly. Legs reddish, coxae black, tibiae whitish and tarsi dusky. Middle cells of hind wings one or none. The larva resembles that of *P. diluta* as far as that description goes.

Stage III.—Head black, a pale dot at apex of clypeus; width .6 mm. Body green, food darker, the four dorsal spines on each side black with white limbs.

Stage V.—Head pale in sutures and face, all the black marks touching each other; width, 1 mm. Body green, dorsum faintly shaded with purplish; spines as before, all distinctly furcate.

Stage VI.—Head pale, the lobes broadly black and a geminate spot in clypeus; width, 1.4 mm. Segments indistinctly 5-annulate, two spines on second (spiracular) annulet, one small one on third behind spiracle, three on fourth; two on each subventral fold. Legs on joints 6-12, 13; rest on venter on surface of leaf. Dorsum to spiracles olivaceous blackish, the four dorsal spines black, short with short limbs or reduced to small black buttons; joint 2 anteriorly, subventral region and feet pale greenish white with colorless furcate spines which fringe the sides. The dorsal spines on joints 2, 3, 12 and 13 are not reduced. At the end of the stage the dorsal color fades to purplish.

Stage VII.—(Ultimate.) Smooth, no spines, annulets folded; shining areas represent the tubercles; color translucent waxy greenish white, greener on the thorax, often blue-green; no purple shade. The larvæ enter the earth and form cells lined with brown secretion. Solitary on the white oak in May, eating the young leaves; single brooded. Found at Pelham Manor and Bellport, Long Island, N. Y., Washington, D. C.

***Periclista albicollis* Norton.**

Stage IV.—As in next stage; head .7 mm.

Stage V.—Head shining black except mouth and a small arcuate line above clypeus which are greenish; width, 1.1 mm. Spines arranged as in the preceding species, quite large and strongly furcate, all black, even the little one on third annulet and the anterior one of the upper subventral fold; lower subventral spines pale, not furcate. Body translucent green, indistinctly annulate. Feet on joints 6-12, 13.

Stage VI.—Head 1.4 mm. The same, the spines with long tapering limbs, longer than the shaft.

Stage VII.—(Ultimate.) Not smooth, the tubercles represented by small distinct cones; not shining, all very light whitish green, very much whiter than in the feeding stages, slightly wrinkly annulate, no marks, no tarry shades. Larva as high as wide, robust. Spins a rather fine brown cocoon either in the earth or after boring in decayed wood. Single brooded. The larva is solitary, rarely several together, resting on the upper side of the leaves of *Q. tinctoria* early in June. They are unusually sluggish, often feeding upon a single leaf.

Others were found on the white oak (*Q. alba*) which appeared less robust and had a pale space on the spines at the bases of the limbs; but the imagines seem indistinguishable from the others.

Brookhaven, Bellport and Yaphank, Long Island, N. Y.

***Periclista emarginata* Mac Gillivray.**

♀. Black, clypeus emarginate, labrum pale; abdomen with the tips of segments lined with whitish below, the last segment brownish; prothorax largely and tegulæ white; legs pale, the femora brown, except narrowly on the under side; tips of tarsi dusky. Under wings with one middle cell or none.

Two ♀♀ bred from larvæ similar to those described (Can. Ent., xxvi, 185), which produced the ♂ type.

Stage IV.—As in next stage, spines all pale; head .7 mm.

Stage V.—Head 1.1 mm., a shade above ocelli, the patch in clypeus single, transverse, later double.

Body green, spines all pale, furcate, arranged as in the preceding species of *Periclista*.

Stages VI and *VII* have been published.

Found on *Q. coccinea* at Pelham Manor and Van Cortlandt Park, N. Y., in May.

***Periclista subtruncata*, sp. nov.**

♀. Similar to the preceding, but the clypeus shallowly emarginate. Shining black, prothorax narrowly and tegulæ white; abdomen entirely black. Legs brown, coxæ and basal two-thirds of femora blackish, tarsi dusky. Sculpturing essentially as in *emarginata*, but the vertical groove on head shows a tendency to cross the transverse one between the posterior ocelli. Length, 5.5 mm. One ♀.

Not strikingly distinct in either imago or larva from *P. emarginata*, but both Mr. MacGillivray and Mr. Ashmead have compared the flies and do not consider them the same.

Stage IV.—Head pale brown, dotted on a greenish ground, a black

patch in clypeus; eye and antennæ black. Body light yellowish green, the furcate spines paler except the thoracic ones which are black tipped. Feet on joints 6-12, 13, the thoracic ones short, scarcely visible from above.

Stage V.—Patch in clypeus brown; body green, dorsal vessel less contrasting.

Stage VI.—Head green, clypeus brownish, eye black. Body rather opaque green, a little whitish dorsally from diffuse fat, dorsal vessel darker green. Furcate spines whitish, dusky tipped on joints 2 and 3 and faintly on anal flap.

Stage VII.—(Ultimate.) Smooth, waxy greenish, eye black; shining, indistinctly annulate, dorsal vessel green. Cocoon in the ground; single brooded.

Found on the black oak (*Q. coccinea*) in Van Cortlandt Park, N. Y., in May.

***Periclista chionanthi* Murtfeldt, (M.S.).**

♀. Shining black; tips of femora and tibiæ dull luteous, tarsi dusky; angles of prothorax narrowly and tegulæ whitish. Wings hyaline, nervures brown-black; second recurrent nerve received at basal third of third submarginal cell. One middle cell in hind wings. Length, 5.5 mm.

Two ♀♀, Coll. U. S. Nat. Mus. (Miss Murtfeldt), no. 296 M.

Larva.—Head shining black, mouth parts only pale. Segments indistinctly 5-annulate, spines furcate, moderate, two on second (spiracular) annulet, three on fourth, two on each subventral fold, all furcate except the pair on lower subventral fold. Body yellowish with numerous fat granules, a broken subdorsal black shade, distinct at the bases of the second spines. Dorsal spines black-ringed at base. Thoracic feet small, abdominal moderate on joints 6-12, 13; rests on venter on surface of leaf. "Slug on white fringe" (*Chionanthus*), Kirkwood, Mo., Dept. Agriculture no. 4048 bis.

***Periclista media* Norton.**

Sitting on the venter on the surface of young leaves of white oak (*Q. alba*), eating circular holes, solitary.

Stage I.—Head very pale brown, eye black; width .3 mm. Body translucent whitish, food brownish; covered with short colorless Y-shaped spines, thick and with short shaft, the limbs blunt, apparently arranged as in the later stages.

Stage II.—Head and body translucent, colorless, eye black; width .4 mm. Spines with long shaft and sharp recurved branches extending

in a longitudinal plane. Segments scarcely annulate. Thoracic feet large, abdominal on joints 6-12, 13.

Stage III.—Waxy white, shining, eye black; width .6 mm. Body pale green, principally from the food. Furcate spines moderate, concolorous whitish. Feet pale. Length, 5.5 mm.

Stage IV.—The same. Head .8 mm., length, 6 mm. The body becomes darker green from the food, but the blood is pale green, tinting the subventral area.

Stage V.—The same; width of head 1.1 mm.

Stage VI.—Entirely green, no marks. Furcate spines rather short; seeming remote, none dark; arrangement as usual in *Periclista* with but two spines on the spiracular annulet. Head greenish white, eye black; width 1.4 mm. Rarely some of the spines are trifid instead of bifid. A variety occurs with a black patch in the clypeus, but it disappears in the last stage, leaving the larva immaculate. Segments indistinctly annulate.

Stage VII.—(Ultimate.) Smooth, all greenish, not shining; head and thorax emerald tinted; dorsal vessel green. Enter the earth and form cells. Single brooded, common on the white oak in May, the commonest of the early spring slugs. Van Cortlandt Park, Bronx Park, Bedford Park, Pelham Manor, N. Y.; Fort Lee, N. J., Brookhaven, Bellport and Yaphank, Long Island.

KEY TO THE AMERICAN SPECIES OF *Periclista*, ♀.

1. Yellow with brown thorax; no black above.....*diluta* Cress.
Prevailing color black.....2
2. Black of dorsum mixed with brown, abdominal segments very narrowly white bordered.....*purpuridorsum* Dyar.
Entirely black above.....3
3. Clypeus somewhat angularly emarginate.....4
Clypeus more broadly and shallowly emarginate or truncate.....5
4. Slender, legs whitish and amber brown; vertical groove from lower ocellar basin distinct.....*emarginatus* Mac G.
Robust, legs shading to black on femora; vertical groove from lower ocellar basin short.....*albicollis* Nort.
5. Clypeus shallowly emarginate.....6
Clypeus truncate, scarcely at all emarginate.....7
6. Legs heavily shaded with blackish brown; transverse groove between upper ocelli straight, slightly crossed by the vertical groove.....*subtruncata* Dyar.
Legs mostly whitish below the femora; transverse groove slightly bent at junction with vertical one, not crossed by it.....*chionanthi* Murtf.
7. Legs pale, femora brownish, abdomen brownish at sides posteriorly; vertical groove short, the lower ocellar basin reaching nearly to the transverse groove.
media Nort.

Isodyctium floridense, sp. nov.

♀. Brown; antennæ, except basal joint, black. Head narrowly darker brown in the sutures, orbits yellowish. Thoracic lobes lined with yellowish as in *rileyi*, but without black, only darker brown double marks on the side lobes. Abdomen brown, basal plates yellowish, lined before and behind narrowly with blackish; beneath shaded with black, especially towards tip. Mesopleura brown, with a yellow line posteriorly. Legs pale. Wings hyaline, veins blackish brown, basal half of stigma pale. Length, 6.5 mm.

One ♀. Florida, U. S. Nat. Mus. (from Am. Ent. Soc.).

Larva unknown.

Isodyctium subgregarium, sp. nov.

♂. Head black, clypeus emarginate with two white dots at tip, labrum pale; clypeus hollowed below each antennæ, the lower rim projecting. Thorax black, tegulæ and collar (except a black dot) white; a line on mesopleura and sutures below white. Abdomen whitish, basal plates and four terminal segments above black, below shaded with black. Legs pale, tarsi shaded with blackish, coxæ and trochanters spotted with black. Wings hyaline, costa pale at base, second recurrent nervure received near base of third submarginal cell. Length, 6 mm.

♀. Pale yellowish, head, thorax and pleura red. Antennæ black except basal joint; narrow black linings in head grooves and in sutures behind mesothorax. Legs yellowish, tarsi slightly tipped with blackish. Wings hyaline, nervures pale, those toward center of wing lined with black. No middle cells in hind wings. Length, 6.5 mm.

Stage IV.—Head green with a large triangular black patch on each lobe and one in clypeus; width .8 mm. Spines furcate, short, three on second and fourth annulets, one behind spiracle, two on each subventral fold, the smaller ones simple. Spines black except the subventral ones; feet pale, abdominal ones on joints 6–12, 13.

Stage V.—The same; patch in clypeus double; width of head 1.2 mm. Spines distinct, the limbs curving, divergent and tapering.

Stage VI.—Head 1.8 mm. Body uniformly green from food, spines black except on lower subventral fold. No change in coloration.

Stage VII.—(Ultimate.) Smooth, entirely green, eye black; shining areas in the places of the spines. Enter the earth and form cells; single brooded.

The larvæ are gregarious in the early stages, but separate before maturity.

Found in May on white oaks (*Q. alba*, *Q. prinus*) at Pelham Manor, Bronx Park and at several places on Long Island.

Isodyctium infrequens, sp. nov.

♀. Robust; head black, a brown dot between antennæ and line at tip of clypeus which is scarcely emarginate. Thorax dark brown, streaked with black on all the

lobes, scutellum black; pleura brown above, black below, pilose. Abdomen brown, segments banded with blackish posteriorly, more distinctly toward base above. Legs brown, tibiæ and tarsi paler. Wings hyaline, costa and stigma pale. One middle cell in hind wings. Length, 6.5 mm.

Stage V.—Head immaculate, eye black; width, 1.1 mm. Body green, dorsal vessel darker; spines moderate, furcate, arranged as is normal for *Isodyctium* with three on spiracular annulet, pale except the terminal ones on joints 2, 3, 12 and 13 which have black limbs and the upper row the whole length which is touched with black at the base of the fork, leaving the apex and shaft pale. Feet pale, 6-12, 13.

Stage VI.—Head 1.6 mm., green, eye narrowly black. Body faintly annulate, spines all pale except the black patches as before. Another had the limbs of the four dorsal spines black whole length.

Stage VII.—(Ultimate.) Head slightly brownish tinted, eye black; width 1.6 mm. Body smooth, green, with shining areas instead of the spines, indistinctly annulate. Color uniform, dorsal vessel dark.

Single brooded, cells in the ground as usual.

Found on the white oak (*Q. alba*) at Brookhaven and Bellport, Long Island, early in June, but probably occurs earlier in the mainland where the season is not retarded by cold winds as on the south shore of the island. Rare.

***Isodyctium murtfeldtiæ*, sp. nov.**

♀. Head black, clypeus emarginate, its tip and labrum whitish. Thorax brown, a black spot on each lobe; metathorax black. Mesopleura brown above, black below, a distinct white line behind; metapleura shining black, lined through the middle with white. Abdomen mostly pale luteous, basal plates and irregular marks on some of the sutures black. Legs pale, black marks only in sutures of trochanters and coxæ. Hind wings with one middle cell. Length, 5.5 mm.

One ♀, Miss Murtfeldt, no. 207 M.

Larva.—Head green, eye narrowly black; width, 1.4 mm. Body green, the spines distinct, well furcate (arrangement not discernible in the specimen, but presumably as in *Isodyctium*), all the basal ones broadly black at the base and with blackish limbs. Food plant, black oak.

***Isodyctium calricolum* Dyar.**

In the larvæ previously described (Journ. N. Y. Ent. Soc., V, 193) only the upper spine on second annulet and upper two on fourth were furcate, the rest being reduced to single spines or cones. I have since found others with the spines nearly normally furcate and others perfectly normal, all the spines furcate except the stigmal one of third annulet,

The hairy, slimy, long-woolly or slender slugs and all edge feeders are foreign to the group.

1. Resting flatly on surface of leaf, feet moderately developed, functional. 2
 Leaf miners, feet functionless or absent. 16
2. Body with spines or points, distinguishable at least subventrally. 3
 Body smooth. 15
3. Two spines on second (spiracular) annulet. 4
 Three spines on both second and fourth annulets. 9
4. Dorsum shaded with blackish in last stage, at least subdorsally. 5
 Dorsum entirely green. 6
5. Head black spotted; dorsum purplish, on *Quercus alba*.

Periclista purpuridorsum

Similar to the preceding. **Periclista diluta***

Head black; a subdorsal black line, on *Chionanthus*. **Periclista chionanthi**

6. Head and spines black; on *Q. alba*, *Q. tinctoria*. **Periclista albicollis**
 Head and spines partly or wholly green. 7
7. Head with a black supra-ocellar shade and double spot in clypeus; on *Q. coccinea*.

Periclista emarginata

Head green or with only a brownish spot in clypeus. 8

8. Clypeus brownish; terminal spines dusky on the tips; on *Q. coccinea*.

Periclista subtruncata

All green, at least in last stage; on *Q. alba* **Periclista media**

- 9 Feeding on trees (*Quercus*, *Carpinus*, *Carya*). 10
 Feeding on shrubs or vines (*Rubus*, *Vitis*, *Spiræa*). 13
10. Head largely black spotted, spines black; on *Q. prinus*, *Q. alba*

Isodyctium subgregarium

Head not spotted, spines mostly pale. 11

11. Spines well forked, not degenerate. 12
 Spines more or less degenerate in last stage; on hickory (*Carya*)

Isodyctium caryicolum

12. Spines black at base and tip; on *Q. coccinea* . . . **Isodyctium murtfeldtiæ**
 Terminal spines only black tipped; on *Q. alba* . . . **Isodyctium infrequens**
13. Spines well forked, dorsal ones with black limbs; on raspberry (*Rubus*)

Monopadnus rubi

Spines reduced to points. 14

14. Head and dorsal points black; on grape (*Vitis*). . . **Erythraspides pygmæa**
 All green, points white; on meadow sweet (*Spiræa*). . . **Blennocampa spirææ**
15. Head black, body white and yellow; on ash (*Fraxinus*)

Monopadnus barda

16. Mining in oak (*Quercus*) **Fenusa curta**
 Mining in raspberry (*Rubus*). **Fenusa rubi**
 Mining in alder (*Alnus*) **Kaliosysphinga varipes**
 Mining in poplar (*Populus*). **Entodecta populi**

NOTE.—Mr. Ashmead has kindly revised the generic references of

* Insufficiently described.

the insects recorded in the above table in accordance with his generic synopsis.

I have excluded the woolly slugs from this table because *juglandis* is clearly referable to the Selandriinæ. There is probably some error connected with the account of the other woolly slug, *Monaphadnus caryæ* of Norton and Packard, and it will be found to be wrongly referred to *Monophadnus*.

NEW SPECIES OF HETEROCERA FROM TROPICAL AMERICA.

BY WILLIAM SCHAUSS.

SYNTOMIDÆ.

Cosmosoma dorsimacula, sp. nov.

Head and palpi black. Legs brown; fore coxæ white. Collar and thorax orange, the latter with two large black subdorsal spots; a minute black point anteriorly on patagiæ. Abdomen orange with four subdorsal black spots; the last three segments entirely black. Wings hyaline, the margins black, the outer margins and apices more widely so; a large black spot at the end of the cell on the primaries. Expanse, 37 mm.

Habitat: Balzapamba, Prov. of Bolivar, Ecuador.

Cosmosoma biseriatum, sp. nov.

Head and palpi black. Collar black with two metallic blue spots. Thorax black anteriorly, orange posteriorly with a large black subdorsal spot containing some metallic blue scales; the patagiæ orange internally streaked with black; thorax below dark yellow, the legs brown streaked at the base with yellow. Abdomen above orange, the last four segments black; the orange portion with lateral transverse black bands, interrupted dorsally. A lateral row of metallic blue spots on all the segments. Underneath the abdomen is yellow; the last segments black and a black band on basal segment. Wings hyaline with black margins, very wide on the outer margins and at apices. A large black spot at the end of the cell on primaries; a large orange spot at the base of the wings. Underneath the wings at the base are yellow. Expanse, 41 mm.

Habitat: Balzapamba, Prov. of Bolivar, Ecuador.

Cosmosoma bolivari, sp. nov.

Head and palpi black. Collar anteriorly black, posteriorly yellow. Thorax yellow, with subdorsal black spots. Abdomen dorsally brown, the first and sixth seg-